



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/724,403	11/27/2000	Shinji Maekawa	07977/258001/US4448	7575

20985 7590 06/19/2003

FISH & RICHARDSON, PC
4350 LA JOLLA VILLAGE DRIVE
SUITE 500
SAN DIEGO, CA 92122

EXAMINER

HUYNH, YENNHU B

ART UNIT PAPER NUMBER

2813

DATE MAILED: 06/19/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/724,403

Applicant(s)

MAEKAWA, SHINJI

Examiner

Yennhu B Huynh

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,7-9,20 and 60-66 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4,7-9,20 and 60-66 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the Amendment filed on 3/27/03.

Election/Restrictions

Applicant's election without traverse of claims 1-9 & 20 in Paper No. 6 is acknowledged.

Claims 5-6, 10-19 & 21-59 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected claims, there being no allowable generic or linking claim. Election was made without traverse in Paper No. 9.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in JP 11-336850 on 11/28/2000. It is noted, however, that the certified copy of the Japanese application has not received as required by 35 U.S.C. 119(b).

Information Disclosure Statement

The information disclosure statement filed 9/02/02 fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the list of information referred to therein has not been received. Correction is required.

Claim Rejections - 35 USC § 112

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20, line 1 is objected to because of the following informalities: --claim 4 or 9--. It is indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7, 62 & 65 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilcoxon (U.S. 5,059,556)

Wilcoxon disclose a method for relieving stress in silicon substrate, which include:

-Re. claim 1: wherein a material having stress of not more than 8×10^9 /cm² is formed in contact with a semiconductor is formed on substrate, whereby an argon impurity element in the semiconductor film is bringing / gettering into contact material (col. 3, lines 1-11, lines 23-34 and lines 49-61 ; col. 5, lines 13-17; col. 8, lines 5,6); col.2, lines 62-68 and col. 4 lines 37-41).

-Re. claims 2 , 7 & 62, : wherein the material is formed by sputtering LPCVD, and within a temperature range of between 500-900 C degrees (col.4, lines 16-46).

-Re. claim 65: wherein the material is a silicon nitride film formed by LPCVD (col.5, lines 31-45 and col. 7, lines 3-8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3,4,8,9,20,60,63,64 & 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilcoxon (U.S. 5,059,556) in view of Yonehara et al.(U.S. 5,670,411).

Wilcoxon disclose substantially all of claimed invention, except for the forming LPCVD with chloride gas (cls. 4, 9 & 64); wherein the Cl_2 is a mixture gas of any one of SiCl_4 , SiH_2Cl_2 , SiCl_3 or Si_2Cl_6 (cl.20 & 60); and the pressure range of LPCVD as well as the ratio of nitride silicon (cls. 3,8,63 & 66).

-Re. claims 4,9,20, 60 & 64 : Yonehara et al. disclose a process of making a semiconductor device with impurity element is gettered into the material, which include wherein the material is formed by LPCVD with a gas containing chlorine and is a mixture gas of any one of SiCl_4 , SiH_2Cl_2 , SiCl_3 or Si_2Cl_6 (col. 8 & 9, lines 33-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wilcoxon invention by incorporating the mixture gas containing chlorine to control the growing of impurity diffusion during heating process.

With respect to claims 3, 8, 63 & 66 the pressure, ratio are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, As noted In re Aller 105 USPQ233, 255 (CCPA 1995), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to expected that a change in pressure, temperature, or in range of ratio, concentration, cycles, thickness, would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 1995). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilcoxon (U.S. 5,059,556) in view of Yamazaki et al. (U.S. 6,444,390 B1).

-Re. claim 61: Wilcoxon disclose a method for relieving stress in silicon substrate, which include wherein a material having stress of not more than 8×10^9 power/cm² is formed in contact with a semiconductor is formed on substrate, whereby an argon impurity element in the semiconductor film is bringing / gettering into contact

material (col. 3, lines 1-11, lines 23-34 and lines 49-61 ; col. 5, lines 13-17; col. 8, lines 5,6); col.2, lines 62-68 and col. 4 lines 37-41).

However, Wilcoxon do not disclose removing the material having tensile stress, a gate insulating and a gate electrode.

Yamazaki et al. disclose process for producing a crystalline silicon with getting impurity element in a semiconductor film, which include removing the germanium material having a tensile stress (Abstract, col. 4, lines 23-28 and col.5, lines 31-35) , a gate insulating 205 and a gate electrode 206 (col. 6, lines 47-53 and col.7, lines 50-63, fig. 2A).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wilcoxon invention by incorporating of removal the material having tensile stress to crystallize the semiconductor film.

Response to Arguments

Applicant's arguments filed on 3/27/03 have been considered but they are not persuasive. Removing the material having a tensile stress is a new issue.

Applicant's argument that Wilcoxon and Yonehara et al. do not disclose an impurity element in a semiconductor film being gettered into the material.

Wilcoxon teach a platinum formed by sputtering with argon into contact with silicon substrate and sintering. The platinum preferred for relieving stress in silicon substrate (col. 3, lines 1-11 and col.4, lines 36-53).

Yonehara et al. disclose impurity element in a semiconductor film being gettered into the material (col.2, lines 5-15, col. 2& 3 lines 59-15, col. 4 & 5, lines 56-3 and col. 5, lines 36-58).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-

Art Unit: 2813

308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Pertinent Prior Art

Takizawa et al. (U.S. 5,734,195) disclose a semiconductor wafer having a sub-surface getter region. The structure includes a wafer, a second element ion implanted into the substrate wafer and accelerates oxygen precipitation to form crystal defects and these crystal defect serve as gettering site and stress is generated, wherein the stress itself serves as a gettering site (col.1, lines 50-63, col. 2 & 3, lines 23-6+).

Ritsuo (JP 6338507) disclose a semiconductor substrate with impurities and crystal defect can be subject to gettering. The structure includes a stress is generated by the difference in covalent linkage radius Si substrate and carbon impurity, and this stress itself becomes the gettering site (Abstract)

Kaoru (JP 7201842 A) disclose forming a gettering region in a scribing line on a surface of a wafer. The process includes a silicon substrate is selectively oxidized after a polysilicon film for relaxation of stress is removed. The stress is enlarged so that a large amount of crystal defect as gettering source is induced in the silicon substrate (Abstract).


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Application/Control Number: 09/724,403
Art Unit: 2813

Page 9

YNBH,

6/8/03